stratasys

CASE STUDY
FDM

Accelerating Manufacturing

With 3D Printing



About Marcopolo

With a history dating back to 1949, Marcopolo is a pioneer and leader in bus body manufacturing in Brazil. Born in Caxias do Sul, Rio Grande do Sul, the company has consistently stood at the forefront of innovation, providing high-quality transportation solutions, and driving the future of mobility.

Among the professionals driving innovation is Tiago Mendes da Silva, Coordinator of Engineering Planning and Application. He leads the implementation of new technologies, project automation using CAD, engineering infrastructure with software and hardware, detailed technical analyses, and the creation of innovative prototypes.



Image courtesy of Marcopolo.

Marcopolo and Additive Manufacturing

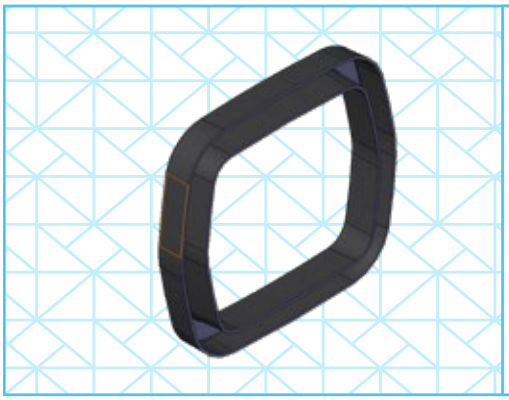
At the Caxias do Sul facility, where Marcopolo produces bus bodies, electric chassis, and metro-rail products, the company has incorporated the innovative technology of Stratasys FDM® 3D printers for over a decade. Since 2012, with the acquisition of a Dimension, followed by the Fortus 900™, and most recently, the F170™.

These 3D printers are strategically integrated to meet the diverse needs of the company, from product engineering, development and processes, maintenance, quality, to the beginning of mass manufacturing.

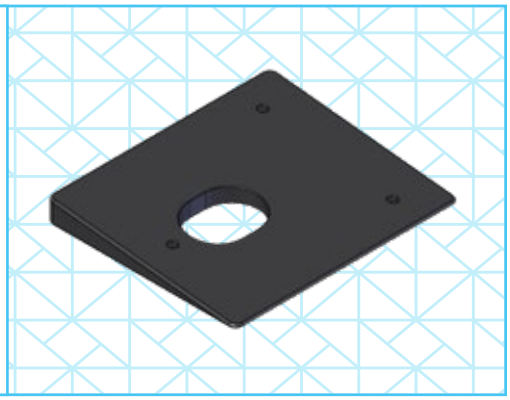
According to Tiago Mendes da Silva, in the last year, more than 221 print requests were fulfilled, totaling about 1,000 manufactured parts. These ranged from essential prototypes for engineering project validation to parts for replacement in automated machines, components for bus verification and assembly (such as jigs), and even final parts used in bus bodies. Notable among these are the card reader for the Urbano Attivi Integral product – fully electric, and the ADAS for the Rodoviário Paradiso G8 product.

To ensure excellence and performance, Marcopolo uses high-quality materials such as ABS, known for its robustness, affordable cost, and ease of post-finishing. Additionally, polycarbonate is used to ensure robustness and superior quality in larger parts manufactured on the Fortus 900, ensuring a flawless final finish. This strategic combination of materials ensures that each printed part contributes to the excellence and durability of Marcopolo products.

Applications of Additive Manufacturing at Marcopolo



Support and finishing for advanced driver-assistance systems (ADAS) Road Paradiso G8 DD (approximately 30 pieces).



Before adopting Stratasys' 3D printing technology, Marcopolo had to import these parts from Germany and Italy. These parts were manufactured through injection molding, resulting in significant costs of approximately R$ 150,000.00 per injected mold, or by using thermoformed tooling, costing around R$ 50,000.00.

Advantages of Adopting 3D Printing

The daily advances at Marcopolo are driven by robust Stratasys 3D printers operating 24 hours a day, seven days a week, with a dedicated uninterruptible power supply system.

“In the development process of the latest generation of road buses, we printed parts that simulated the final ones to avoid stopping high-speed road tests in product reliability evaluation. This procedure accelerated the launch process by about one year: door finishes, mirror finishes, supports for electronic dashboard items, and even a complete seat structure simulating the final steel one are examples we used in this product,” says Tiago Mendes da Silva.

He further emphasizes, “Recently, the company’s internal intrapreneurship group confirmed that the future of the industry involves additive manufacturing, with scale gains potentiated in an environment with customized and personalized products like Marcopolo’s, data-approved by the use and access of Stratasys 3D printers. We are in the evaluation process to establish an industrial-scale printing center in 2024 for the group.”

The internal maintenance team has implemented inventories of printed materials for items with a high replacement rate, such as finishes, pneumatic screwdriver locks, electric actuation buttons, and supports for fixed elements of the control panel. This strategy ensures immediate replacements, eliminating the wait for the printing of new items.

Even celebratory events have been revolutionized by Stratasys. All trophies and gifts awarded to winners in various awards across different sectors of the company are being produced using 3D printing technology.



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